	Application No.	Applicant(s)
Notice of Allowability	10/796,217	GUPTA ET AL.
	Examiner	Art Unit	
	Robert Stevens	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *RCE filed 7/20/2007*.

2. ☒ The allowed claim(s) is/are *1-4, 6-16, 19-22, 24-34, 37 and 42-43 (re-numbered as 1-33)*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some*   c) ☐ None   of the:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
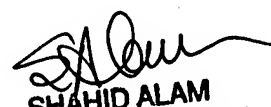
    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

    Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20071024* .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

SHAHID ALAM
PRIMARY EXAMINER

U.S. Patent and Trademark Office

PTOL-37 (Rev. 08-06)   **Notice of Allowability**   Part of Paper No./Mail Date 20071024

DETAILED ACTION

1.   The Office has withdrawn all rejections raised in the Final Rejection mailed 4/19/2007.

Examiner's Amendment

2.   An examiner's amendment to the record appears below. Should the changes and/or

additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR

1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the

payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with

Christian A. Nicholes, Reg. No. 50,266, on 10/24/2007.

The application has been amended as follows:

In the claims:

3.   Cancel claims 5, 17-18, 23, 35-36 and 38-39.

4.   Amend claims 1, 9, 19-22, 24-34, 37 and 43, as follows:

1. (Currently Amended) A machine-implemented method comprising the steps of:

generating, based on a first set of data associated with a plurality of dimensions, a second

set of data; and

storing said second set of data in a ~~tangible~~ volatile memory or a ~~tangible~~ non-volatile

memory;

wherein the first set of data is not dense relative to a first dimension of the plurality of

dimensions; wherein the second set of data is dense relative to the first dimension;

wherein the first set of data includes a plurality of subsets of data and each of the subsets

of data is a partition of the first set of data, and is associated with a single dimension

value selected from one dimension of the plurality of dimensions;

wherein the step of generating includes separately performing, for each particular subset

in the plurality of subsets, a mini join operation that involves an outer join between a

third set of data and the particular subset; and

wherein separately performing the mini join operation for each particular subset in the

plurality of subsets generates the second set of data.

9. (Currently Amended) The method of claim 87, wherein the outer join is a left outer

join.

19. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable

medium carrying one or more sequences of instructions, which when executed by one or

more processors, causes the one or more processors to perform the method recited in

Claim 1.

20. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed·by one or more processors, causes the one or more processors to perform the method recited in Claim 2.

21. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 3.

22. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 4.

24. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 6.

25. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 7.

26. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 8.

27. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 9.

28. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 10.

29. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 11.

30. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 12.

31. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 13.

32. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or more sequences of instructions, which when executed by one or more processors, causes the one or more processors to perform the method recited in Claim 14.

33. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable

medium carrying one or more sequences of instructions, which when executed by one or

more processors, causes the one or more processors to perform the method recited in

Claim 15.

34. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable

medium carrying one or more sequences of instructions, which when executed by one or

more processors, causes the one or more processors to perform the method recited in

Claim 16.

37. (Currently Amended) A system comprising:

one or more processors; and

a ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable medium carrying one or

more sequences of instructions, which when executed by the one or more processors,

causes the one or more processors to perform the method recited in Claim 1.

43. (Currently Amended) A ~~tangible~~ volatile or ~~tangible~~ non-volatile machine-readable

medium carrying one or more sequences of instructions, which when executed by one or

more processors, causes the one or more processors to perform the method recited in

Claim 42.

5.   After a thorough search, and in light of the prior art of record, claims 1-4, 6-16, 19-22,

24-34, 37 and 42-43 (renumbered as 1-33) are allowed.

Reasons For Allowance

6.   The following is an examiner's statement of reasons for allowance:

The present invention is directed to techniques for the densification of data, where a fact

table is referred to as "dense" along a dimension 'D' if the fact table contains all possible values

of 'D' for any given combination of the other dimensional values in the fact table.

The closest prior art, Rogers et al. (US Patent No. 6,397,214), is directed to a join

operation of two or more data sets using forced dimensions. The further cited reference, Graefe

et al. (US Patent No. 6,298,342), is directed to relational-calculus operations for database

queries.

These references do not disclose a data densification process, whereby a partitioned outer

join comprised of the performance of a mini join operation for each partition of a first data set to

arrive at a dense, second data set, having all possible values of a particular dimension for any

given combination of other dimension values in a fact table.

7.   Any comments considered necessary by applicant must be submitted no later than the

payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for

Allowance."

Contact Information

8.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Robert Stevens whose telephone number is (571) 272-4102. The

examiner can normally be reached on M-F 6:00 - 2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, John E. Breene can be reached on (571) 272-4107. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Robert Stevens
Examiner
Art Unit 2162

October 25, 2007

SHAHID ALAM
PRIMARY EXAMINER